

Nalco Docket No. 7668

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REMARKS

This is in reply to the Office Action mailed on June 19, 2003 (Paper No. 6).

Claims 1-7 are currently pending.

Claims 1-7 are rejected under 35 U.S.C. § 103(a) over Patent No. 6,517,723 ("Daigger") in view of Patent No. 5,914,040 ("Pescher").

No claims are amended.

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DISCUSSION**The Rejection of Claims 1-7 under 35 U.S.C. § 103(a) over Daigger in view of Pescher**

Claims 1-7 are rejected under 35 U.S.C. § 103(a) one of Daigger in view of Pescher.

In particular, the Examiner states:

In the primary embodiment of Daigger et al, the patent discloses treatment of activated sludge using a first bioreactor comprising an immersed membrane filter, followed by a second bioreactor having a second immersed membrane filter. In such second bioreactor, membrane filtration is preceded by preliminary treatment including addition of a filter aid, oxidant supply and coagulant (see especially column 2, line 50 through column 3, line 23 and column 6, line 64 through column 7, line 24). The coagulant is stated at column 7 as being added in order to aid in the removal of suspended solids, phosphorous and other substances.

The claims firstly differ in requiring that the coagulant be added to sludge, not wastewater as in such primary embodiment of Daigger et al. However, Daigger et al also disclose combining to the two bioreactors into a single bioreactor for treating the sludge (column 4, line 66 through column 5, line 3). At the time the present invention was made, it would have been obvious to one of ordinary skill in the art to have combined the features of Daigger et al embodiment requiring separate, sequential bioreactors, including the coagulant addition step, into the embodiment of Daigger et al featuring one combined bioreactor, so as to simplify treatment plant construction and maintenance and reduce required process volumes [Daigger et al column 4, lines 20-25], while continuing to efficiently remove suspended solids and other substances.

Paper No. 6 at Page 3.

In reply to Applicants' arguments presented in the Amendment and Reply dated May 27, 2003 (Paper No. 5), the Examiner states:

Firstly, it is argued that Daigger et al does not disclose adding coagulant to the waste being treated when it is in the form of activated sludge. However, it is submitted that such teaching of Daigger et al would be obvious, encompassing incorporating the feature of coagulant addition of the primary embodiment of Daigger et al featuring two sequential bioreactors into the embodiment where the two sequential bioreactors are combined into a single bioreactor.

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It is also argued that Pescher teaches addition of coagulant to wastewater after, rather than prior to, membrane filtration, and also is directed towards treatment of water rather than activated sludge. However, it is submitted that Pescher is primarily relied upon for teaching that coagulant treatment should comprise utilizing cationic type polymer. Further, Pescher suggests treatment of effluent starting material of various types of organic semi-solid waste, as well as waste water (col. 6, lines 55-62).

Paper No. 6 at page 5.

Applicants respectfully traverse this rejection.

Applicants respectfully assert that contrary to the Examiner's statement quoted above to the effect that Daigger teaches that the separate, sequential bioreactors, including the coagulant addition step can be combined into a one combined bioreactor, Daigger merely teaches that the second filtration step can be omitted. The relevant passage reads in its entirety:

In the preferred embodiment of this the membrane filter bioreactor 12 and the PAC membrane filter reactor 14 are deployed in series as illustrated in FIG. 1. However, there are applications where the membrane filter bioreactor 12 of the present invention provide adequate treatment of the wastewater, in which case the membrane filter bioreactor can be utilized without the PAC membrane filter reactor 14.

Daigger at column 4, line 63 to column 5, line 3.

Therefore, Applicants respectfully assert that Daigger does not disclose that the two reactors can be combined into a single operation, but rather discloses nothing beyond the concept that secondary treatment of the water exiting the membrane filter bioreactor may be unnecessary in certain instances. Applicants respectfully assert that nothing in Daigger teaches or suggests adding coagulant to the activated sludge in the membrane bioreactor. To the contrary, Daigger teaches that in the event that treatment in the PAC membrane filter reactor is required, coagulant and/or oxidant may be added subsequent to the filtration in the membrane bioreactor and prior to the second filtration step. Nowhere does Daigger imply that coagulant can be added directly to the activated sludge in the membrane bioreactor.

As discussed in detail in Paper No. 5, Applicants respectfully assert that Pescher teaches a variant of commonly employed wastewater treatment protocols where the wastewater is treated with

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a cationic polymer coagulant prior to mechanical dewatering. It is only after this mechanical dewatering that the filtrate is optionally subjected to filtration through an ultrafiltration membrane.

Applicants respectfully assert that Pescher does not teach or suggest the use of cationic polymer coagulants in an activated sludge process for the clarification of wastewater in a membrane bioreactor but rather merely recites a variation of well known sludge dewatering processes where polymeric coagulants are added to condition an unactivated sludge prior to mechanical dewatering.

Applicants respectfully assert that nothing in Pescher teaches or suggests that the mechanical separation disclosed therein is equivalent to the membrane filtration of this invention, or alternatively that the mechanical separation can be omitted such that the sludge/coagulant mixture contacts the ultrafiltration membrane. Thus, Applicants respectfully assert that even if the teachings of Pescher and Daigger are combined, the resulting combination does not teach or suggest the instantly claimed invention, where there is no prior filtration step prior to contact of coagulant-treated waste with a filtration membrane.

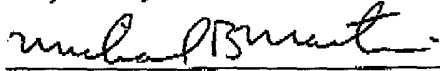
Accordingly, as neither Pescher or Daigger, alone or in combination, suggest adding the instantly claimed polymeric coagulants to activated sludge in a membrane bioreactor, Applicants respectfully request withdrawal of the rejection of claims 1-7 under 35 U.S.C. § 103(a) over Daigger in view Pescher.

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OFFICIAL**CONCLUSION**

As discussed above, Applicants respectfully assert that none of Daigger and Pescher, alone or in combination, teach or suggest addition of a cationic polymeric coagulant to the activated sludge in a membrane bioreactor. Accordingly, Applicants respectfully request withdrawal of the rejection of claims 1-7 under 35 U.S.C. § 103(a) over Daigger in view of Pescher and assert that this application is in condition for allowance. Early notice to this effect is earnestly solicited.

Respectfully submitted,



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